

Contract-based Programming

A Route to Finding Bugs Earlier

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Proposal for a 45-50 minute presentation at Linux Day 2014 in Cagliari.

Abstract

Contract-based programming is a software development technique, which is used to find programming errors earlier in the development process.

In its strictest form, the “contracts” are checked as a part of the compilation process, and only a program which can be proven to conform with the contracts will compile.

In a less strict form, it is more similar to “preventive debugging”, where the contracts are inserted as run-time checks, which makes it more likely to identify errors during testing.

Some of the programming languages which explicitly support contract-based programming are Eiffel, SPARK and Ada. With a bit of an effort it is possible to apply contract-based programming with any programming language.

The presentation is organised in three main sections:

- Type/object invariants.
- Pre- and postconditions for operations.
- Making the contracts for entire packages consistent.

Throughout the presentation, the examples will be in Ada 2012, but I am open to discuss how contract-based programming can be applied in other programming languages.

Level

The intended audience is anybody with enough programming experience to know concepts like types, encapsulation and packages. Having seen source text in Pascal-like programming languages will be a benefit.

Short biography

Jacob Sparre Andersen has previously given talks on Linux, LEGO, language technology, Libre-Office and Ada. He has given tutorials and talks on contract-based programming at FOSDEM [2], Ada-Europe [1] and DANSAS [3].

See <http://www.jacob-sparre.dk/cv/> for a full curriculum vitae.

References

- [1] Ada 2012 (Sub)type and Subprogram Contracts in Practice. <http://ada-europe2014.org/tutorials.html#T6>.
- [2] Contract Based Programming in Ada 2012. https://archive.fosdem.org/2014/schedule/event/ada_contracts/.
- [3] Contract-based Programming with Ada 2012 - an Experience Report. <http://dansas.sdu.dk/2013/program.html#cbpa2012>.